

REMARKS

At the time the current Official Action was mailed, the Examiner rejected claims 35 and 54-65. Reconsideration of the application in view of the remarks set forth below is respectfully requested.

Rejections under 35. U.S.C. § 102

The Examiner rejected claims 35, 54-55, and 57-60 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,938,106 (the “Pierson” reference). Specifically, the Examiner stated:

Referring to Figs. 2 and 4, and related text, Pierson discloses [Re claim 35] a method of forming solder balls, the method comprising the acts oft (a) disposing solder within a plurality of receptacles disposed within a surface of a conveyor belt; and (b) heating the solder disposed within the receptacles to form a solder ball within each receptacle (see col. 3, line 14- col. 4, lines 31).

Office Action, p. 2.

The Applicant respectfully traverses this rejection. Anticipation under Section 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985). For a prior art reference to anticipate under Section 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). To maintain a proper rejection under Section 102, a single reference must teach each and every element or step of the rejected claim. *Atlas Powder v. E.I. du Pont*, 750 F.2d 1569 (Fed. Cir. 1984). Thus, if the claims

recite even one element not found in the cited reference, the reference does not anticipate the claimed invention.

With regard to claim 35, the act of disposing solder within a plurality of receptacles disposed within a surface of a conveyor belt is recited. The Examiner has relied on Figs. 2 and 4 and on the cited text at col. 3, line 14 to col. 4, line 31 as disclosing this material. However, despite the Examiner's representation to the contrary, the Applicant notes that this act is not disclosed in the cited text and figures or in the remainder of the Pierson reference.

In particular, Pierson does not disclose receptacles disposed within the surface of a conveyor belt, and therefore does not disclose the act of disposing solder within such receptacles. A "conveyor belt" may be defined as "an endless belt or chain, set of rollers, etc., for carrying materials or objects short distances, as from one part of a building to another." *See* Webster's New Universal Unabridged Dictionary, p. 445 (1996). The conveyor belt of the Pierson reference, presumably the support band 22, does not have such receptacles disposed within its surface. *See* Pierson, Figs. 2 and 3, col. 3, lines 4-13 and lines 56-67. Instead, the support band 22 supports and conveys a flexible circuit 2 having openings 7 in its surface. *See* Pierson, Figs. 2 and 3, col. 2, lines 36-50 and col. 3, lines 56-67.

The flexible circuit 2, however, is not a conveyor belt, as recited, or even part of a conveyor belt. Instead, the flexible circuit 2 is the object *conveyed* by the conveyor belt, i.e., support band 22. *See* Pierson, Fig. 2, col. 3, lines 56-67 and col. 4, lines 25-30. Indeed, as

explained in the Pierson reference, after the solder balls have been cooled and washed, “the flexible circuit 2 emerges with solder balls 64 formed thereon ready for whatever use to which it is to be put.” Pierson, col. 4, lines 25-30. Obviously the flexible circuit 2 could not be put to another use if it was in part of an endless conveyor belt.

In view of the absence from the Pierson reference of a plurality of receptacles disposed within the surface of the conveyor belt, no *prima facie* case of anticipation exists for claim 35. The Applicant, therefore, respectfully requests reconsideration and allowance of claim 35 and those claims depending therefrom.

Rejections under 35 U.S.C. § 103

The Examiner rejected claim 56 under 35 U.S.C. § 103(a) as being obvious in view of the Pierson reference and U.S. Patent No. 5,244,143 (the “Ference” reference). Specifically, the Examiner stated:

Pierson does not disclose wherein disposing solder within the plurality of receptacles comprises disposing solder within non-wettable receptacles. However Ference discloses this feature (see col. 6, lines 10-31). It would have been obvious to a person of ordinary skills to do combine Pierson with Ference to easily remove the solder balls from the receptacles.

Office Action, p. 3.

The Applicant respectfully traverses this rejection. The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the

prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

With regard to claim 56, the Applicant respectfully notes that remarks made above with regard to claim 35 are equally applicable to claim 56 as to the deficiency of the Pierson reference. Claim 56 is, therefore, believed to be allowable in view of the deficiency of the Pierson reference noted above.

Furthermore, the Applicant notes that, contrary to the Examiner's statements, there is no motivation to combine the Pierson and Ference references in the manner suggested by the Examiner. In particular, the relevant portion of the Ference reference cited by the Examiner states, in part, that, “[p]referably, all surfaces which come into contact with the molten solder should not be wet by the solder, so that the molten solder does not adhere thereto.” Ference, col.

6, lines 28-31. Pierson, to the contrary, teaches that the formed solder ball is supposed to adhere, in particular, to a contact pad 6. See Pierson col. 2, lines 2-5, col. 4, lines 25-30, and col. 5, lines 6-7. In other words, despite Pierson specifically disclosing a motivation to form solder balls that adhere to a part of the exposed surface (the contact pad 6), the Examiner has chosen to incorporate aspects of the Ference specifically directed to preventing adhesion of the solder balls to the exposed surfaces. These contrary motivations clearly teach away from the combination relied upon by the Examiner. Indeed, in attempting to combine the Pierson and Ference references despite these conflicting motivations, the Examiner appears to have impermissibly relied on the hindsight gained from the present application.

Therefore, in view of the deficiencies of the Pierson reference noted above and in view of the contrary teachings of the Ference and Pierson references, no *prima facie* case of obviousness exists. Reconsideration and allowance of claim 56 is, therefore, respectfully requested.

In addition, the Examiner rejected claims 61-65 as under 35 U.S.C. § 103(a) as being obvious in view of the Pierson reference. The Applicant respectfully traverses this rejection. In particular, the Applicant notes that claims 61-65 are patentable in view of the deficiency of the Pierson reference noted above.

With regard to claims 63-65, however, the Applicant provides the following additional comments. Regarding claims 63-64 the Examiner states:

Pierson discloses a solder ball holder 80 containing solder balls already made. But it does not disclose transferring the solder balls from the conveyor belt to a catch basin positioned downstream of the heating device. It would have been obvious to do so to have the solder balls already made contained in a solder ball holder 80. It is inherent that the step removing the solder balls from the conveyor belt is performed for the balls to be contained in the holder.

Office Action, p. 3.

The Applicant notes that the rationale provided by the Examiner is entirely at odds with the invention of the Pierson reference. First, as noted previously, the solder balls of the Pierson reference are not formed on the conveyor belt (support band 22) so they cannot be transferred or removed from the conveyor belt as recited in claims 63 and 64. Furthermore, the solder balls of the Pierson reference are attached to the flexible circuit 2 for future use *with* the flexible circuit 2. *See* Pierson, col. 4, lines 25-30. Even if the flexible substrate 2 were construed to be a conveyor belt or part of a conveyor belt, it would not be obvious to *remove* the solder balls from the flexible circuit 2 since the purpose of Pierson is to *attach* the solder balls to the flexible circuit 2 for future use. *See* col. 1, lines 10-14, col. 2, lines 2-5, and col. 4, lines 25-30.

In addition, the Examiner's reference to the solder ball holder 80 is entirely misplaced. In particular, referring to Fig. 5 of the Pierson reference and the associated text, the solder ball holder 80 holds the supply of solder balls being disposed on the flexible circuit 2. *See* Pierson, Fig. 5 and col. 4, line 62 to col. 5, line 7. If the Applicant understands the Examiner's position, the Examiner is suggesting that solder balls from the solder ball holder 80 are placed on the flexible circuit 2, from which they are subsequently removed and transferred back to the solder ball holder 80. Contrary to the Examiner's position, such a modification is not only not obvious,

it is entirely circular and undesirable. If the Examiner wishes to maintain this rejection, the Applicant respectfully requests that the Examiner provide a more complete explanation of why one skilled in the art would be motivated to modify a process so that it not only does not accomplish its intended purpose, but quite literally accomplishes nothing.

With regard to claim 65, the Examiner stated:

Pierson does note discloses wherein removing the solder balls comprises vibrating the conveyor belt to discharge the solder balls from the conveyor belt. However, the examiner takes Official Notice that this is conventionally done to ensure that the balls drop to the desired locations at the right time.

Office Action, p. 4.

The Applicant respectfully traverses the finding of which the Examiner takes Official Notice. In particular, the Applicant disagrees that it is conventional to vibrate a conveyor belt to discharge solder balls. Indeed, the Applicant is unaware of other processes in which solder balls are formed in receptacles on the surface of the conveyor belt. Therefore, the Applicant believes it is improper for the Examiner to assert that there is a conventional technique for removing such solder balls. Pursuant to M.P.E.P. § 2144.03, Applicant respectfully requests that the Examiner provide documentary evidence of the noted subject matter in the next communication if the present rejection is to be maintained.

In view of the deficiency of the Pierson reference previously noted, and in view of the additional deficiencies noted above, no *prima facie* case of obviousness exists with regard to

claims 61-65. Reconsideration and allowance of claims 61-65 is, therefore, respectfully requested.

Conclusion

In view of the remarks set forth above, Applicant respectfully requests reconsideration of the Examiner's rejections and allowance of all pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

General Authorization for Extensions of Time

In accordance with 37 C.F.R. § 1.136, Applicant hereby provides a general authorization to treat this and any future reply requiring an extension of time as incorporating a request therefor. Furthermore, Applicant authorizes the Commissioner to charge the appropriate fee for any extension of time to Deposit Account No. 13-3092; Order No. 97-1008.03/FLE.

Respectfully submitted,

Date: September 15, 2004



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